



Sea Ice Thickness



This text is based on sea ice research in the projects iAOOS and DAMOCLES, among others

Sea ice thickness and sea ice extent play a key role in research into climatic changes in the Arctic. While sea ice extent can be measured with the aid of satellite data, there are today no satellite sensors that can measure sea ice thickness. However sea ice thickness measurements can be made on the ice itself by drilling, a procedure which is accurate but time-consuming. With the use of electromagnetism the sea ice can be measured faster and more efficiently, either on foot on the ice or from a helicopter.

Ground Measurements



... but always watch out for the “big white”

Foto: Marcel Nicolaus



Foto: Sebastian Gerland

Classical sea ice thickness measurements are carried out in 5 cm broad drill holes with a measuring tape. In addition measurements are made of the snow thickness and the distance between the ice surface and the water surface in the drill hole. The measurements are often made along a profile in order to obtain a good overview of the ice thickness in a more extensive area.

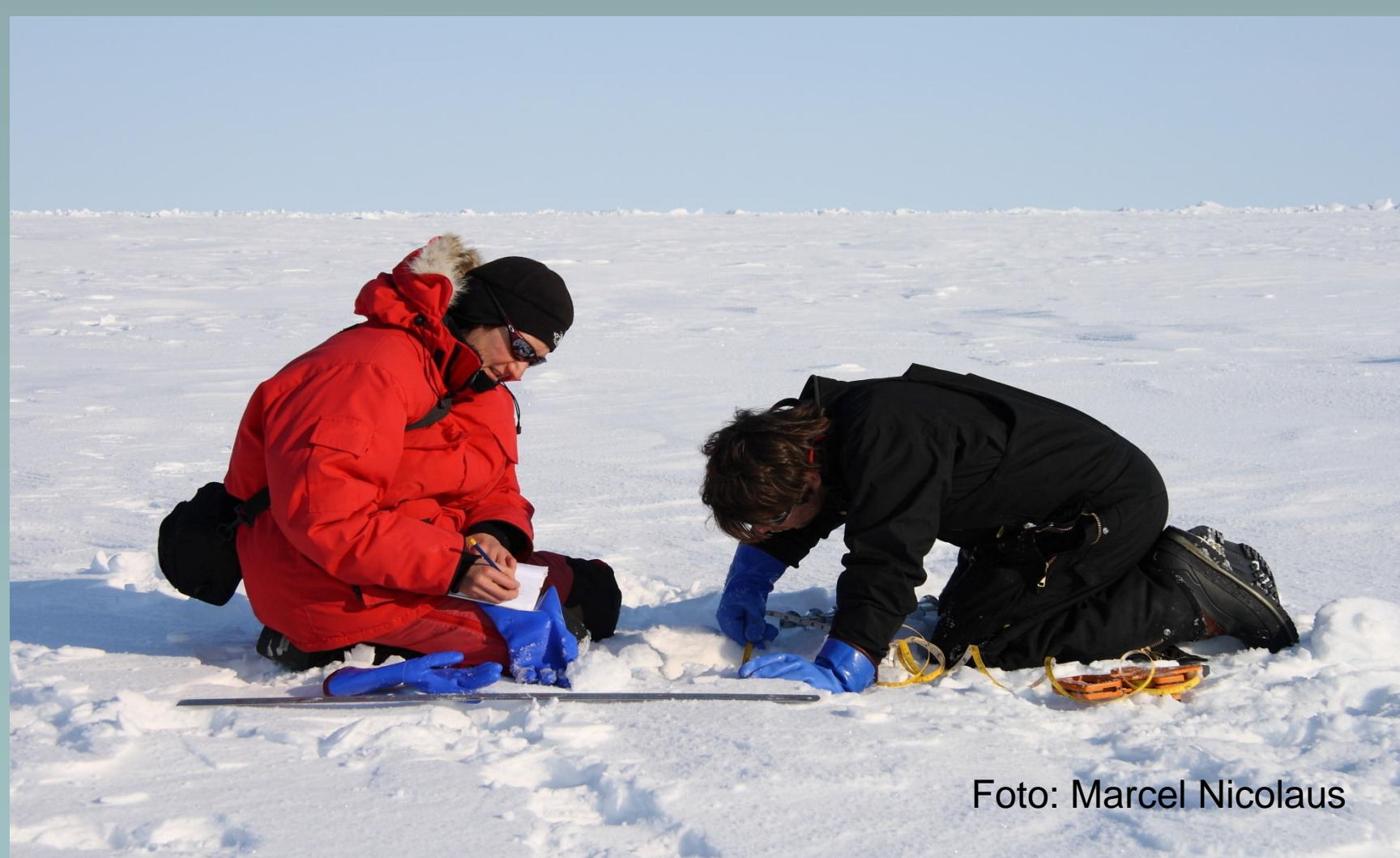


Foto: Marcel Nicolaus



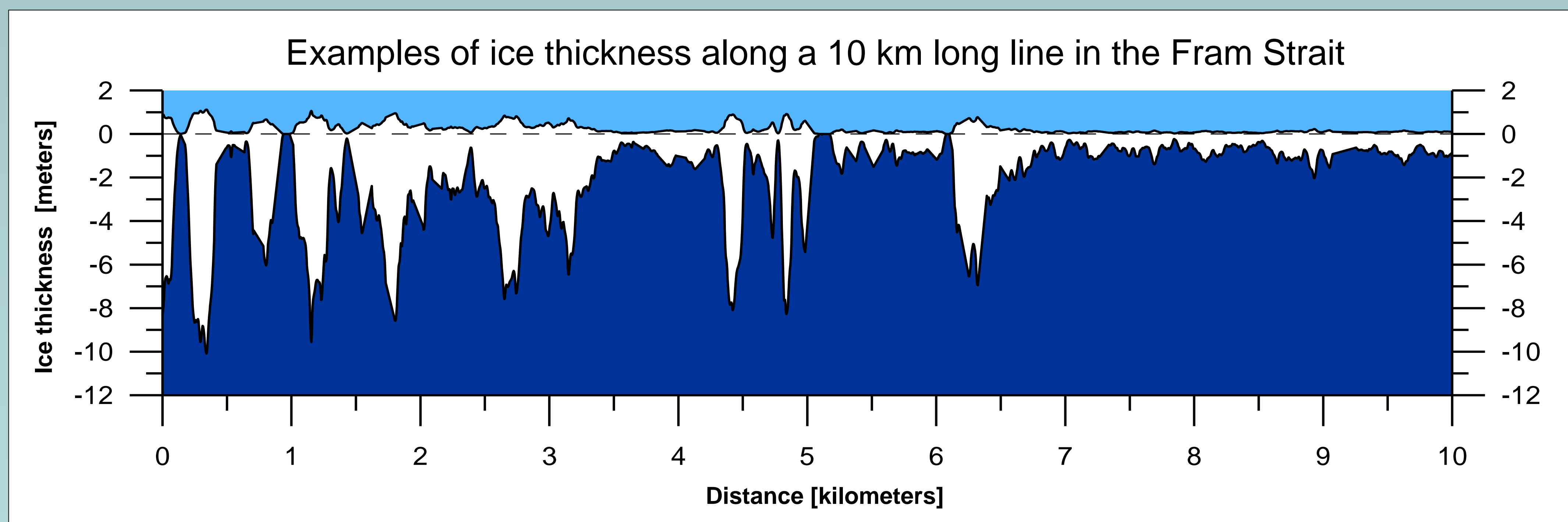
Foto: Sebastian Gerland

With an electromagnetic (EM) instrument ice thickness can be measured more quickly but a few drill holes (direct measurements) are necessary to calibrate the instrument.

Measurements from a helicopter



Foto: Sebastian Gerland



The “EM Bird” instrument

Using the EM Bird it is possible to make ice thickness measurements along a long profile (approx. 250 km) with an accuracy of less than 10 cm. An EM Bird measures the distance to the snow surface (laser) and to the ice undersurface (electro mechanics). The difference between these two measurements gives us the ice thickness.



Foto: Tor Ivan Karlsen